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General

[redacted] analysis of the degree of mechanization of major types of 25X1 construction work in Poland. This degree is determined by the percentage of the given work implemented with the aid of machinery and equipment (or performed by mechanical methods) in relation to the total amount of the same work performed in the given year.

1. The amount of ~~the~~ construction equipment in Poland

The machinery and equipment park, called in Polish "Usprzetowienie", is still based mainly on equipment of foreign and not Polish origin. Home production, besides some medium equipment like concrete mixers and loading equipment, hardly exists. All the heavy equipment is foreign, such as German war indemnities, American army surplus, and is imported from various countries.

Equipment produced in Poland since 1957 forms part of the park, but even in 1959 the majority of construction equipment is of foreign origin.

The following foreign equipment is very often encountered:

Power shovels, excavators;	E-1105, $1m^3$ bucket capacity	USSR
	E- 505, $0.5m^3$ " "	"
	Aufbau $0.75m^3$ " "	Universal- East Germany
	Skoda $2.5\ m^3$ " "	electric - Czechoslovakia
	Fiorentini $0.6m^3$ "	- Italy
	Orenstein & Koppel, an old type with steam engine	
Bulldozers, pushing machines;	Caterpillar Bulldozer	-USA
	SM 80	_USSR
	D-157, 130 HP	-West Germany
	Fiat type L-55, 56 HP	_Italy
	Angledozer	-Great Britain

Loading equipment	Bleichert for loose materials	- East Germany
	AR-60 large loading machine with multibucket conveyer	
Earth movers	6 m^3	- USSR
	Tournapull	- USA
Tower cranes	SBK-1 Stroitelny Bashenny Kran	-USSR
	Pioneer Light gantry crane	-USSR
	Baukran, a light crane known commonly as Baustorch	-East Germany
	Wolf, heavy old German crane	
	Derric old German crane	
Self-propelled cranes	some bought as army surplus	-USA
	January 8 ton	-USSR
Dumpers	Tatra 7 ton	-Czechoslovakia
	3 ton	-Hungary
	various types army surplus	-USA

This big variety of equipment of various years of production greatly complicates repairs and exchange of spare parts. In connection with the increase of home production, it will be possible to straighten out this problem by withdrawing the old obsolete equipment, but this process will require about 8-10 years.

The present situation and the amount of heavy construction equipment is presented in Table 2 following, based on an article written by A. Junak titled "Numbers.... numbers".....published in Fundamenty, 26 July 1959, on page 8 .

Table 2. Equipment of socialized construction-assembly enterprises in fundamental heavy construction machines on 31 December 1958

Number of Machines	1955	1956	1957	1958
1. Single Bucket (power shovels)	520	568	597	733
2. Multibucket excavators	50	84	90	73
3. Bulldozers	410	478	770	967
4. Earth movers	130	129	133	96
5. Tower Cranes, above ~~18~~ tm	351	418	443	458
6. Self-propelled Cranes, caterpillars and wheel	241	400	525	590

2. Mechanization of earthwork

Earthwork belongs to the category of so-called heavy and time consuming work. When performed manually it requires great physical effort. On average, it is counted that one worker is able to dig in medium soil about 2.0 - 2.5 cubic meters in 8 hours and one excavator with 1 m^3 bucket capacity replaces 50 workers. It is obvious that the construction industry concentrates on replacing such manual work by machinery. However earthwork only appears to be very simple work; in reality the full mechanization of construction earthwork is difficult, expensive and complicated.

There is not yet full mechanization of earthwork in Poland, but some processes of earthwork are mechanized, and the level and progress in this field is determined by the so-called coefficient of mechanization of earthwork. This is however not an accurate name. It is what the Polish official statistics give as a coefficient (very often it is called "Index" of mechanization of earthwork) and is not an index of earthwork but of one fundamental process of earthwork, namely digging. In the technical dictionary this process is called digging or excavating capacity (urok

or better ukop in Polish) which means precisely the process of digging earth which embraces cutting off a piece of earth from its natural ground, loading into the bucket, clam, shovel, etc, lifting this earth, moving it for a short distance within the radius of the arm of the excavator, unloading to a truck, dumper or any other vehicle which is used for the transportation of earth, or just unloading on the site nearby.

The above description of the whole process is necessary to understand that the index of mechanization of earthwork given at present in official statistics does not embrace all these processes of earthwork, but only the process of digging, and the present name is misleading. It exaggerates the progress of mechanization of earthwork, 25X1 not disclosing that this mechanization embraces only a part of earthwork.

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The index of mechanization of earthwork is different for different years and for different ministries and enterprises. For example this index amounted in 1957 for the enterprises which were implmenting most of earthwork in Poland:

a. For enterprises subordinate to the Ministry of Construction 78%

b. For enterprises subordinate to the Ministry of Road and Air Transportation 60%

c. For enterprises subordinate to the Ministry of Railroads 45%

This index gives the percent of digging implemented with the aid of machines in relation to the total amount of digging implemented by a given enterprise. e.g. If an enterprise subordinated to the Ministry of Construction in 1957 had to do a total of 25 million cubic meters of earthwork, they implemented 78%, i.e., 19.5 million with excavators, and 22% by manual work.

Therefore the index or coefficient of mechanization of earthwork in this enterprise of the Ministry of Construction was on average 78%.

The table below shows how the mechanization of earthwork developed in the Ministry of Construction.

Table 3

Year	Index of mechanization of earthwork in the enterprises subordinate to the Ministry of Construction
1950	32.5%
1951	38.0%
1952	63.0%
1953	57.6%
1954	51.0%
1955	56.5%
1956	-
1957	78.0%
1958	81.0%
1959 Plan	83.0%
1965 Plan	90.0%

These figures are based on:

For the years 1950-1955 — Boleslaw Kierski and Michal Zubelewicz article "The Problem of efficiency of work in housing construction", published in Inwestycje i Budownictwo No 5, 1959, page 2.

For the year 1958 1959 — Boleslaw Kierski, "Technical progress in construction in the Five Year Plan 1961-1965", published in Construction Review (Przeglad Budowlany) No 4, April 1959, page 161-165.

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The index for 1954 is lower than for 1953 because in 1954 the enterprises of military construction which had been subordinate to the Ministry of National Defense were taken over by the Ministry of Construction. (It was known at this time as the Ministry of City and Settlement Construction). These enterprises of military construction did a lot of earthwork manually and for this reason their index of mechanization was lower. After the merger, the average index of mechanization of earthwork of the Ministry went down.

In general it should be remembered that the index of mechanization can increase by an increase in the number of excavators or by a better use of them, or if the total plan of earthwork is lowered. The main reason for the gradual increase of the index of mechanization of earthwork up to 1958 was the influx of new excavators. As is seen in Table 3, the index of mechanization of earthwork in the enterprises subordinated to the Ministry of Construction rises suddenly in the years 1950-1952 from 32.5% to 63.0% and afterwards more slowly. During the seven years 1959-1965, the planned increase is small, from 83.0 - 90.0%.

This is because 90.0% is the top level which can be achieved in Poland. Some of earthwork must be implemented manually on small projects where it does not pay at all to use heavy excavators. The use of an excavator is economical in Poland if there is at least 5000 cubic meters of digging. This is because the imported and domestic machines are large, e.g. with 0.5 -1.0 m^3 bucket capacity, and there is a shortage of small excavators suitable for small construction projects.

Therefore there is great pressure in Poland on heavy industry to produce small excavators, and the new model which will be produced has 0.25 m^3 bucket capacity. The construction industry however asks in vain for a smaller, 0.15 m^3, excavator which would also permit mechanization on small construction projects and to achieve a level of mechanization of earthwork in Poland of 95%, but the machine industry delayed the implementation of these suggestions to the period after 1965.

The enterprises of the Ministry of Construction and Building Materials Industry are on the highest level of mechanization in Poland. As it was stated earlier in this study, the enterprises of the Ministry of Construction implement only about one third of the total construction-assembly work in Poland, and this percentage will remain until around 1965. An extract from the article written by Bolesław Kierski and

Jerzy Witkowski, "Technical problems in construction 1959", published in Inwestycje i Budownictwo, February 1959 on page 17-24, confirms the analysis made [redacted] 25X1

This article reads as follows:

"....In the total outlays for the construction and assembly production in 1959, the output of enterprises subordinated to the Ministry of Construction and Building Materials Industry will amount to about 34 percent; in relation to outlays for the socialized economy this output will amount to about 41 percent ...."

Other ministries and construction enterprises have less equipment and for this reason the average index of mechanization of earthwork for the entire country is lower than for the Ministry of Construction. Although the Ministry of Construction does only about one third of the national construction-assembly production, it does, according to [redacted] estimate, at least 50% of all earthwork. And as B. Kierski said 25X1 in the article "Technical progress in Construction in the Five Year Plan 1961-1965", ~~was~~ published in Przeglad Budowlany No 4, April 1959:

.."The mechanization of excavation work should attain only an insignificant increase to about 85 percent..."

This means that the average index of mechanization of earthwork for the entire country planned for the year 1965 is 85%. This index amounted in 1957 [redacted] 25X1 [redacted] to 59% and he estimates it will be about 66-70% in 1959. 25X1

The indexes of the official Polish statistics are high enough and indicate that the level of mechanization of earthwork is approaching its highest practical point. However the level of mechanization of earthwork is in reality not so satisfactory, because the Polish index shows only the basic process of earthwork, i.e. digging process, but it does not mention the remaining very important processes.

The following processes are performed besides the digging:

1) Breaking the ground, which is performed by bulldozers. This is very important in some categories of soil, and with rubble, consists of the following. A bulldozer goes in front of the excavator and pushes the earth to a place where the power shovel has only to pick it up, and of course the work of the excavator is therefore more efficient. If there is no bulldozer available the excavator must constantly change its place of operation. The power shovel (excavator) is usually heavy and on caterpillars, while the bulldozer is mobile, and easy to turn in pushing, scraping and loosening earth for the bucket of the shovel; without the bulldozer the power shovel wears out much more quickly.

At any rate the proper organization of earthwork requires the use of at least one calfdozer (small bulldozer) which cooperates with two power shovels. It is accepted in Poland that one calfdozer can break up and push about 200 cubic meters of earth during a day. The number of 967 bulldozers in Poland (see Table 2) for 806 excavators is seemingly sufficient, but in reality the bulldozers break down or are damaged very quickly and are also used for many other purposes, so the lack of bulldozers is still a plague of construction enterprises in Poland, because Poland does not yet produce its own bulldozers and is only preparing this production.

2.) Compaction of earth is an important process when an embankment or a railroad track is built. Each layer of earth must be compacted before the next is put on, practically every 20 centimeters (about eight inches) must be compressed. A buldozer may be used for this purpose which by moving on a fresh embankment is at the time compressing the earth. This also is done on a dumping ground where unnecessary earth must be transported. Such a pile of earth must be built properly, otherwise there would soon be no approach for trucks bringing the earth. Very often in Poland a brigade

of manual workers is necessary to keep such dumping places in order, because this process is only partly mechanized in Poland.

3) Transportation of earth Very often some of the earth which was dug out will be used again after the foundation is built. In the meantime it is necessary to dump the earth nearby. This process is best performed by skip loaders, earthmovers and shovelling machines which take the bulldozer-loosened earth and dumps it. There is a shortage of earthmoving machines ; there were still 133 in 1957, but only 96 in 1958 because so many were destroyed and not replaced. This work process is therefore done by small horse-drawn wagons or by trucks, which is very ~~non~~ uneconomical. Poland does not produce earth movers and all requests for them submitted to USSR were disregarded because there is also a shortage of these machines in USSR and they are expensive, too.

4). Grading The process of grading and smoothing excavations is performed manually in Poland because of the shortage of graders. Grading of scarps and steep slopes is also manual because of the shortage of proper equipment. Grading and scraping of thin layers (about 10 cm), too shallow to be done by shovel and too hard to be done by bulldozer, is also mainly manual, and only about 6% of such work is mechanized.

5) Long distance transportation of earth is performed mainly by trucks, therefore this is a mechanized process. However because of shortage of dumpers, this transport is done by ordinary 3-4 ton trucks which is really inefficient. Unloading from an ordinary truck must be done manually with shovels, and a 3-4 ton truck can take only a maximum of two cubic meters of earth and is therefore not productive. Four ton dumpers should be used or special seven ton dump-trucks. Only about 30% of mass earth transportation is mechanized properly, the remainder by the use of ordinary

trucks or by so-called"rigid transportation" on small gauge railways driven by small locomotives using side tippers.

Other processes which are mechanized in the West such as digging of ditches, laying of drainpipes, compaction of earth, etc. are performed in Poland by manual labor.

Beginning in 1955, the Polish engineers called attention to the problem of mechanization of earthwork in all its processes, and they called this full mechanization "complex" to distinguish it from the misleading index of mechanization used by the official statistics.

The index of complex mechanization of earthwork is different from the index of mechanization of digging, and of course much lower. It is difficult to define because the earthwork is almost never done properly using:

power shovels of various and proper types
ditch diggers
bulldozers
angledozers
scrapers
graders
earthmovers, carriers
scarp cutting and grading equipment
dumpers
machines for laying drainpipes
etc.

In general there is a shortage of proper rubber wheeled chassis and semi-caterpillars in Poland, and mainly heavy, immobile caterpillar mounted equipment is used. Finally, the assortment of equipment is very poor. The index of complex mechanization of earthwork has not yet been introduced in official Polish statistics because not enough processes are mechanized yet. In fact only the digging, and to a large extent,

the breaking of earth and long distance transportation is mechanized. The remainder, which requires earthmovers, graders, scrapers and other special equipment is only very little -- from 0 to 10% -- mechanized.

For this reason, in spite of the high index of mechanization of earthwork digging, the real level of complex mechanization of earthwork, regarded as the index of mechanization, is very low. It is almost impossible to determine, but if one wanted very badly to compare the complex mechanization of earthwork in Poland with that in the West, one could say that the approximate level of mechanization is no more than 20-25% of that given in the official statistica.

The economic profitability of mechanization of earthwork in Poland

The cost of mechanization of earthwork in Poland is very high for the following reasons:

a. Very high costs of maintenance, repairs of equipment and exchange of spare parts.
b. Low level of organization of earthwork.
c. Slowness and high cost of transportation of power shovels between construction sites because of shortage of the proper heavy tractors.
d. A limited assortment of types of excavators and heavy uneconomic caterpillar machines being used instead of light types on wheels.
e. Shortage of accompanying equipment such as bulldozers, scrapers and graders. For this reason the entire rhythm of work is manual and not "mechanized". Very often a machine must wait for some work which must first be performed by manual labor.
f. Preponderance of electric motors instead of combustion engines, because the connection with the power net is not always available.
g. Low level of skill of the operators of construction equipment; their drunkeness because of good earnings in comparison with other workers.
h. Shortage of earth moving equipment; shortage of shiploaders, and dumpers. It is necessary to employ on every ordinary truck used for transportation of earth about four workers who are idle during transport. The shortage of heavy trucks above seven tons capacity. The driver of a small truck is paid the same as the driver of a heavy truck.

i. In general bad roads in Poland, also neglect of building or improvement of roads before the transportation and earthwork starts.

j. Mistakes in design or measurements. Too deep excavations, removal and transportation of earth to poorly chosen places, improper compacting, and resultant sinking, faulty drainage and securing of excavations.

It is well known that good effects are achieved when all processes of work are mechanized. If one part is mechanized and another large part is still manual the work is sometimes more expensive than purely manual work. For this reason it is not strange that sometimes in Poland, where there is not a complex mechanization and the wages of workers are low, mechanized earthwork is more expensive than manual. In 1957 one cubic meter of earthwork in general construction costs about 24 zlotys, but if such work was given to so called "Dutchmen" (manual workers specializing in earthwork) they made the excavation, transported the earth by their own horse driven wagons, and graded the bottom and sides for 15 zlotys. A group of "Dutchmen" employed in 1955 in Nowa Huta did much more in three weeks than a mechanized enterprise with plenty of equipment. In addition, the work of these "Dutchmen" was cheaper, better, and more thorough.

In spite of that, the construction enterprises continue mechanization because it is difficult to obtain manual workers. The government is also against employing horse driven wagons because they earn too much, and create additional buying power on the market; they are regarded as "kulaks", a kind of village capitalism which should not be allowed. Undoubtedly the wages of workers are low, but taking into account family allowances, social security, cheap housing and various troubles with the workers, labor is quite expensive for the state.

3. Mechanization of transportation on the building site.

Under transportation on the building site is included lifting and placing of materials within the building site. As in earth-work, there are also some discrepancies in official Polish statistics of mechanization of this transportation, and only since 1956 has a more precise nomenclature been used which gives the proper picture of all processes of transportation on the building sites.

According to an article written by Boleslaw Kierski and Michal Zubelewicz entitled, "The efficiency of work in housing construction," Inwestycje i Budownictwo no 5, 1959, p. 2, vertical transportation at the enterprises of the Ministry of Construction was mechanized to the following extent:

in 1950	60 %
1951	70 %
1952	94 %
1953	96 %
1954	98.0%
1955	98.5%

Thus, the mechanization of vertical transportation in Poland in the enterprises of the Ministry of Construction in 1955 reached 98.5%, almost the maximum. In other enterprises the index is lower but on the national level, mechanization of vertical transportation reached 90% in 1955 and in 1959 according to [redacted] 25X1 estimate the average national level is 95%. In practice the maximum has been achieved in this field. Therefore, the government proclaimed in 1955-1956 that the era of manual transport of bricks, mortar and materials was gone forever, and that this transportation was fully mechanized. Nevertheless, the degree of mechanization does not represent great progress, because the mechanization refers only to the one process -- lifting -- but not to the entire operation. It is again fragmentary and not complex mechanization. Transportation on the building site with the use of lifts

(hoisting equipment) embraces the following processes:

a. Horizontal transportation from storage place on the building site to the lift.
b. Vertical transportation or hoisting to the level (floor) where the material is needed.
c. Horizontal transportation on the floor from the lift to the working place of the workman, where the material is used.

In fact only process b/ was really mechanized and operations a/ and c/ are still usually manual. Thus, a worker brings bricks and mortar by wheelbarrow to the lift, and on the floor the workers take away the materials from the lift and carry them by wheelbarrow to the bricklayer, etc. Thus, the mechanization of vertical transportation by hoisting equipment only reduces the hardest work but does not entirely replace manual labor.

The engineering circles, especially the Institute for Organization and Mechanization of Construction, demanded that the official statistics prepared by the Main Statistical Administration (GUS) should not give the index of vertical transportation by lift at all. They said it should be said that the hoisting is not manually performed but no more should be said about this index, but an index of complex mechanization of transportation on the building site embracing the processes a/, b/, and c/ of vertical and horizontal transportation should be used. Such complex mechanization can be performed by three methods:

a. By conveyers. This equipment can in general be used only on construction of low buildings up to three floors.
b. By cranes which take the material from the storage place, lift it, and place it on the working place.
c. Pumping of liquid materials, concrete and mortar, but such a method is seldom applied in Poland because of the shortage of such pumps.

Of these three methods the most important is the crane, therefore, in all technical publications when describing mechanization on the building site the definitions "mechanization by lift" or "mechanization by crane" is or should always be given. However, only mechanization by crane should be regarded as proper and full mechanization on the building site. Here the indexes are low and in 1953 amounted at the enterprises of the Ministry of Construction: mechanization of transportation by cranes to 1.0% in 1954; 13.1% in 1955; 37.0% in 1958; 45.0% in the plan for 1959. [Source: B. Kierski and M. Zubelewicz, "The Problem of efficiency in Housing Construction," Inwestycje i Budownictwo, No 5, 1955, and B. Kierski and J. Witkowski, "Technical Problems in Construction in 1959," Inwestycje i Budownictwo, Feb 1959, p. 17-24.]

Attention should be called to the fact that the Ministry of Construction gets almost all the cranes produced in Poland for home use, and for this reason has a relatively high index of mechanization and transportation by cranes. An average national index for 1959 does not exceed, according [redacted] estimate, 15-20%. 25X1 This is confirmed by an article by B. Kierski, "Technical Progress in Construction in the Five Year Plan 1961-1965," published in Przeglad Budowlany, April 1959: ..."Lifting by tower cranes in 1965 should comprise about 30% of the total lifting operations. . ."

It should be mentioned here that even this mechanization with the aid of cranes which represents progress under Polish conditions, does not indicate complex mechanization of the horizontal transportation. The crane can only reach within the radius of its arm, to about 20 and in exceptional cases to 30 meters. This reach is sufficient to place material on the required place and level because the crane itself is located in such a way, or so many cranes are used, that this requirement is fulfilled. However, this reach of 20-30 meters is in general insufficient to reach also the entire storage area of the building site.

For this reason it is necessary to transport the material relatively short distances from the storage place to where it can be reached by crane. This can best be done by a self-propelled crane, but because of shortage of such cranes in Poland, it is mostly done manually. This means that even in places where tower cranes are used, the mechanization is not complex because one process of transport is manual.

In Polish conditions one self-propelled crane is necessary for one to two stationary cranes. The best for maneuvering and for bringing materials near the crane was the self-propelled fork lift crane, of which there are only a few in Poland. There were only in 1958 in Poland 590 self-propelled cranes and 458 tower cranes ~~at~~ in all.

The self-propelled cranes are the most needed equipment for various work at the construction-assembly work, at the repair depots, storage depots, at prefabrication plants etc., and for this reason it is difficult to get the allocation of such cranes to the construction site. The development of prefabrication absolutely requires self-propelled cranes. Summing up it can be said:

a. There is not yet complex mechanization of transportation on the building site.

b. Mechanization with the aid of tower cranes embraced about 20% of all enterprises in 1958, but about 37% of enterprises subordinate to the Ministry of Construction.

c. On the remaining construction sites, the horizontal transportation on the ground and above is manual, and the vertical transportation is mechanized by lifts or hoists.

d. Complex mechanization will be possible only after the construction industry is supplied with fork lift cranes. The Polish machine industry promises first production of these cranes in 1961-1962.

4. Mechanization of loading and use of containers.

Loading operations comprise loading and unloading of loose materials such as sand, gravel, crushed stones, etc. This work is usually manually performed in the construction industry in Poland, and it is estimated that about 20% of workers employed in construction are used for this work. In the enterprises subordinated to the Ministry of Construction and Building Materials Industry, the loading was 17% mechanized in 1958 while the average percentage for the entire country was approximately 12%.

They have just started to pay proper attention to loading work, and to allocate more funds for the purchase of necessary loading equipment. According to an article published in Fundamenty, 5 July 1959, the following sums will be allocated for the mechanization of loading work within own-investments of the state construction-assembly enterprises:

128	million zlotys	1961
159	" "	1962
148	" "	1963
138	" "	1964
127	" "	1965

Total 700 million zlotys during the next Five Year Plan 1961-1965

It is planned to achieve at the enterprises of the Ministry of Construction 50% mechanization of loading work in 1965; according to B. Kierski in Przeglad Budowlany, April 1959, "Technical Progress in Construction in the Five Year Plan, 1961-1965," and in 1959 the level is only 20%.

Use of containers

This problem pertains to long distance transportation by trucks and freight cars. The advantages of using containers are reduction of damage and facilitating the handling and storage of materials. There are many materials, such as bricks, which should be packed in a container before lifting. All the same, complex mechanization of liquid materials like concrete, mortar and loose materials requires the use of some kind of container.

Therefore, great efforts have been made since 1950 to introduce the use of containers for bricks in Poland. There were two important resolutions of the Ministers Council in 1951 and in 1955 on this matter, premiums were awarded, fines imposed etc.,and the entire matter ended in failure. Containers are not used, and in current construction publications nothing is said about them, and the government silently acknowledges failure.

The main reason was lack of experience and organizational ability. In using containers, the materials should not be repacked. Thus, when a brick is taken out of the kiln, it should be in a container and even go in to the oven in a container. But it is difficult to manufacture such containers which could stand the temperature in the kiln where bricks are burned. Besides, the container must be loaded by a crane on a railroad car or motor truck, and the brick factories do not have cranes. Afterwards there must also be cranes at the railroad stations and on the construction sites, gantry or fork lifting cranes of which there is a shortage in Poland, and for this reason the introduction of containers for bricks was not successful.

In connection with the use of containers the problem of transportation of cement should also be mentioned. At present cement is transported in paper sacks, but the supply of paper is short in Poland, and for this reason this system must be changed to transportation of cement in loose form. The first of such transports was performed in 1959 by trucks equipped with containers for cement, imported from England by the Cement Milling Factory in Zeran. The transfer to loose transportation requires many organizational changes in the cement industry, in the construction industry, and in road and rail-transport. Cement silos must be built on the construction sites and all

units involved must have pneumatic installations for suction of cement from truck containers to silos on the construction site. The railroads must have tight covered freight cars or tanks. Finally the efficiency of supply service and punctuality of deliveries must be improved. For this reason the program which forsees that in 1965 30% of the annual cement production, i.e., about three million tons, should be transported loose is very difficult to realize. [redacted] 25X1 from the planned 30%, only about 15% will be achieved, and this is the highest reached in 1965 under the provision that mainly the establishments for manufacture of prefabricated elements will be adjusted for the loose transportation of cement. However, the medium and small construction projects will avoid transportation of cement in loose form.